09/673274 529 Rec'd PCT/PTO 12 OCT 2000 WO 99/53053 PCT/FR99/00843 1 SEQUENCE LISTING (1)GENERAL INFORMATION: (i) APPLICANT: (A) NAME: RHONE-POULENC AGROCHIMIE (B) STREET: 14-20 Rue Pierre BAIZET (C) CITY: LYON OUNTRY: Fance (E) (FM POSTAL CODE: 69009 (ii) TATLE OF INVENTION: Gene encoding heliomicine, protein obtained, vector containing it, transformed organisms obtained and method of preparation (iii) NUMBER OF SEQUENCES: 20 (iv) COMPUTER READABLE FORM: (A) MEDIUM TYPE: Floppy disk (B) COMPUTER: IBM PC compatible (C) OPERATING SYSTEM: PC-DOS/MS-DOS SOFTWARE \ PatentIn Release #1.0, (D) Version #1.30 (EPO) INFORMATION FOR SEQ ID NO: 1: (2) (i) SEQUENCE CHARACTERISTICS:

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- (A) LENGTH: 147 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA

(ix) FEATURE:

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- (A) NAME/KEY: CDS
- (B) LOCATION: 1..147

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1: AGC TTG GAT AAA AGA GAC AAG TTG ATT GGC AGC TGT GTT TGG GGC GCC 48 Ser Leu Asp Lys Arg Asp Lys Leu Ile Gly Ser Cys Val Trp Gly Ala 1 5 10 15 GTC AAC TAC ACT AGT GAC TGC AAC GGC GAG TGC AAG CGC CGC GGT TAC 96 Val Asn Tyr Thr Ser Asp Cys Asn Gly Glu Cys Lys Arg Arg Gly Tyr 20 25 30 AAG GGT GGC CAT TGT GGA TCC TTC GCT AAC GTT AAC TGT TGG TGT GAA 144 Lys Gly Gly His Cys Gly Ser Phe Ala Asn Val Asn Cys Trp Cys Glu 35 40 45 ACC 147 Thr 49

- (2) INFORMATION FOR SEQ ID NO: 2:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 169 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single

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(D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

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- (A) NAME/KEY: CDS
- (B) LOCATION: 1..132

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

							-						ТАС Тут			48
1				5					10					15		
GAT	TGC	AAC	GGT	GAG	TGC	AAG	AGG	AGG	GGT	TAC	AAG	GGT	GGT	CAC	TGC	96
Asp	Cys	Asn	Gly	Glu	Cys	Lys	Arg	Arg	Gly	Tyr	Lys	Gly	Gly	His	Cys	
			20					25					30			
GGT	TCC	TTC	GCT	AAC	GTG	AAC	TGC	TGG	TGC	GAG	ACT	TGAG	AGCI	CG		142
Gly	Ser	Phe	Ala	Asn	Val	Asn	Cys	Trp	Cys	Glu	Thr					
		35					40									

GCGAGGCGAA CGTGTCGACG GATCCGG

(2) INFORMATION FOR SEQ ID NO: 3:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 261 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA

(ix) FEATURE:

- (A) NAME/KEY: CDS
- (B) LOCATION: 3..224

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:											
CC ATG GGT TTC GTG CTT TTC TCT CAG CTT CCA TCT TTC CTT GTG	47										
Met Gly Phe Val Leu Phe Ser Gln Leu Pro Ser Phe Leu Leu Val 1 5 10 15											
TCT ACT CTT CTT CTT TTC CTT GTG ATC TCT CAC TCT TGC CGT GCC GAT	95										
Ser Thr Leu Leu Leu Phe Leu Val Ile Ser His Ser Cys Arg Ala Asp	22										
20 25 30											
AAG CTT ATC GGT TCC TGC GTG TGG GGT GCT GTG AAC TAC ACT TCC GAT	143										
Lys Leu Ile Gly Ser Cys Val Trp Gly Ala Val Asn Tyr Thr Ser Asp 35 40 45											
TGC AAC GGT GAG TGC AAG AGG AGG GGT TAC AAG GGT GGT CAC TGC GGT Cys Asn Gly Glu Cys Lys Arg Arg Gly Tyr Lys Gly Gly His Cys Gly	191										
50 55 60											
TCC TTC GCT AAC GTG AAC TGC TGG TGC GAG ACT TGAGAGCTCG GCGAGGCGAA	244										
Ser Phe Ala Asn Val Asn Cys Trp Cys Glu Thr	211										
65 70											
CGTGTCGACG GATCCGG											

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 120 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

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- (A) NAME/KEY: CDS
- (B) LOCATION: 12..101

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

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GCGTCGACGC G ATG GGT TTC GTG CTT TTC TCT CAG CTT CCA TCT TTC CTT 50 Met Gly Phe Val Leu Phe Ser Gln Leu Pro Ser Phe Leu 5 10 1 CTT GTG TCT ACT CTT CTT CTT TTC CTT GTG ATC TCT CAC TCT TGC CGT 98 Leu Val Ser Thr Leu Leu Phe Leu Val Ile Ser His Ser Cys Arg 15 20 25 GCT GGAGACGCGA ATTCACACA 129 Ala 30

(2) INFORMATION FOR SEQ ID NO: 5:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 75 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

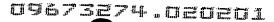
(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 7"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:
GCGTCGACGC GATGGGTTTC GTGCTTTCT CTCAGCTTCC ATCTTTCCTT CTTGTGTCTA 60
CTCTTCTTCT TTTCC 75

(2) INFORMATION FOR SEQ ID NO: 6:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 72 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear



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(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 8"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6: TCGCCGGCAC GGCAAGAGTA AGAGATCACA AGGAAAAGAA GAAGAGTAGA CACAAGAAGG 60 AAAGATGGAA GC 72

(2) INFORMATION FOR SEQ ID NO: 7:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 80 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 9"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:
GATAAGCTTA TCGGTTCCTG CGTGTGGGGT GCTGTGAACT ACACTTCCGA TTGCAACGGT 60
GAGTGCAAGA GGAGGGGTTA 80

(2) INFORMATION FOR SEQ ID NO: 8:

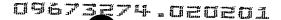
(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 109 base pairs

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(B) TYPE: nucleotide

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- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 10"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:
CCGGATCCGT CGACACGTTC GCCTCGCCGA GCTCTCAAGT CTCGCACCAG CAGTTCACGT 60
TAGCGAAGGA ACCGCAGTGA CCACCCTTGT AACCCCTCCT CTTGCACTC 109
(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 85 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic

oligonucleotide 11"

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(X1) SEQUENCE DESCRIPTION: SEQ ID NO: 9: AGGGCCCCCT AGGGTTTAAA CGGCCAGTCA GGCCGAATTC GAGCTCGGTA CCCGGGGGATC 60 CTCTAGAGTC GACCTGCAGG CATGC 85

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:

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- LENGTH: 66 base pairs (A)
- (B) TYPE: nucleotide

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- STRANDEDNESS: single (C)
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 12"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10: CCCTGAACCA GGCTCGAGGG CGCGCCTTAA TTAAAAGCTT GCATGCCTGC AGGTCGACTC 60 TAGAGG 66

INFORMATION FOR SEQ ID NO: 11: (2)

(i) SEQUENCE CHARACTERISTICS:

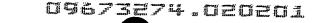
- (A) LENGTH: 93 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 13"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11: CCGGCCAGTC AGGCCACACT TAATTAAGTT TAAACGCGGC CCCGGCGCGC CTAGGTGTGT 60 GCTCGAGGGC CCAACCTCAG TACCTGGTTC AGG 93

(2) INFORMATION FOR SEQ ID NO: 12:



(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 93 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic

oligonucleotide 14"

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:
CCGGCCTGAA CCAGGTACTG AGGTTGGGCC CTCGAGCACA CACCTAGGCG CGCCGGGGCC 60
GCGTTTAAAC TTAATTAAGT GTGGCCTGAC TGG 93

- (2) INFORMATION FOR SEQ ID NO: 13:
 - (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 50 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 15"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13: GGTCTAGAAT GGCCTGCACC AACAACGCCA TGAGGGCCCT CTTCCTCCTC

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(2) INFORMATION FOR SEQ ID NO: 14:

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- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 50 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 16"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14: CCGAATTCGG CGCCGTGCAC GATGCAGAAG AGCACGAGGA GGAAGAGGGC

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(2) INFORMATION FOR SEQ ID NO: 15:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 81 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single

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(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

(A) NAME/KEY: CDS

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(B) LOCATION: 7..73

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

TCTAGA ATG GCC TGC ACC AAC AAC GCC ATG AGG GCC CTC TTC CTC 48Met Ala Cys Thr Asn Asn Ala Met Arg Ala Leu Phe Cys Ile1510

CTG CTC TTC TGC ATC GTG CAC GGC GCCGAATTC81Val Leu Phe Cys Ile Val His Gly1520

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 24 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 17"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

GATAAGCTTA TCGGTTCCTG CGTG

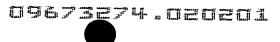
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(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear



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(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION: /desc = "synthetic oligonucleotide 18"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17: ggctcgagtc aagtctcgca ccagcagttc ac

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 213 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA

(ix) FEATURE:

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- (A) NAME/KEY: CDS
- (B) LOCATION: 7..205

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18: TCTAGA ATG GCC TGC ACC AAC AAC GCC ATG AGG GCC CTC TTC CTC CTC

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Met Ala Cys Thr Asn Asn Ala Met Arg Ala Leu Phe Cys Ile 1 5 10

 		 		CAC His		 	 	 	 	96
-	_			ACT Thr	-					144
				CAC His				 	 	192
 	GAG Glu 65	 TGAC	TCGA	lG						213

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(2) INFORMATION FOR SEQ ID NO: 19:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 838 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: double
 - (D) TOPOLOGY: linear
- (ii) MOLECULE TYPE: DNA
- (ix) FEATURE:
 - (A) NAME/KEY: CsVMV promoter
 - (B) LOCATION: 7..532
- (ix) FEATURE
 - (A) NAME/KEY: multiple cloning site
 - (B) LOCATION: 533..568

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(ix) FEATURE

(A) NAME/KEY: terminator

(B) LOCATION: 569..832

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19: AAGCTTCCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60 ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120 CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180 GAATACGTAG AAATTGAAAA AGAAGAACCA GGCGAAGAAA AGAATCTTGA AGACGTAAGC 240 ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGTGA TTGTGAAAGA GACATAGAGG 300 ACACATGTAA GGTGGAAAAT GTAAGGGCGG AAAGTAACCT TATCACAAAG GAATCTTATC 360 CCCCACTACT TATCCTTTTA TATTTTTCCG TGTCATTTTT GCCCTTGAGT TTTCCTATAT 420 AAGGAACCAA GTTCGGCATT TGTGAAAACA AGAAAAAATT TGGTGTAAGC TATTTTCTTT 480 GAAGTACTGA GGATACAACT TCAGAGAAAT TTGTAAGTTT GTAGATCTCG ATTCTAGAAG 540 GCCTGAATTC GAGCTCGGTA CCGGATCCAA TTCCCGATCG TTCAAACATT TGGCAATAAA 600 GTTTCTTAAG ATTGAATCCT GTTGCCGGTC TTGCGATGAT TATCATATAA TTTCTGTTGA 660 ATTACGTTAA GCATGTAATA ATTAACATGT AATGCATGAC GTTATTTATG AGATGGGTTT 720 TTATGATTAG AGTCCCGCAA TTATACATTT AATACGCGAT AGAAAACAAA ATATAGCGCG 780 CAAACTAGGA TAAATTATCG CGCGCGGTGT CATCTATGTT ACTAGATCGG GGATCGAT 838

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 1036 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: DNA

(ix) FEATURE:

(A) NAME/KEY: CsVMV promoter

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(B) LOCATION: 7..532

(ix) FEATURE

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- (A) NAME/KEY: CDS
- (B) LOCATION: 539..736

(ix) FEATURE

- (A) NAME/KEY: nos terminator
- (B) LOCATION: 767..1030

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

AAGCTTCCAG AAGGTAATTA TCCAAGATGT AGCATCAAGA ATCCAATGTT TACGGGAAAA 60 ACTATGGAAG TATTATGTGA GCTCAGCAAG AAGCAGATCA ATATGCGGCA CATATGCAAC 120 CTATGTTCAA AAATGAAGAA TGTACAGATA CAAGATCCTA TACTGCCAGA ATACGAAGAA 180 GAATACGTAG AAATTGAAAA AGAAGAACCA GGCGAAGAAA AGAATCTTGA AGACGTAAGC 240 ACTGACGACA ACAATGAAAA GAAGAAGATA AGGTCGGTGA TTGTGAAAGA GACATAGAGG 300 ACACATGTAA GGTGGAAAAT GTAAGGGCGG AAAGTAACCT TATCACAAAG GAATCTTATC 360 CCCCACTACT TATCCTTTTA TATTTTTCCG TGTCATTTTT GCCCTTGAGT TTTCCTATAT 420 AAGGAACCAA GTTCGGCATT TGTGAAAACA AGAAAAAATT TGGTGTAAGC TATTTTCTTT 480 GAAGTACTGA GGATACAACT TCAGAGAAAT TTGTAAGTTT GTAGATCTCG ATTCTAGA 538

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ATG GCC TGC ACC AAC AAC GCC ATG AGG GCC CTC TTC CTC CTC GTG CTCMet Ala Cys Thr Asn Asn Ala Met Arg Ala Leu Phe Leu Leu Val Leu151015	586										
TTC TGC ATC GTG CAC GGC GAT AAG CTT ATC GGT TCC TGC GTG TGG GGT Phe Cys Ile Val His Gly Asp Lys Leu Ile Gly Ser Cys Val Trp Gly 20 25 30	634										
GCT GTG AAC TAC ACT TCC GAT TGC AAC GGT GAG TGC AAG AGG AGG GGT Ala Val Asn Tyr Thr Ser Asp Cys Asn Gly Glu Cys Lys Arg Arg Gly 35 40 45	682										
TAC AAG GGT GGT CAC TGC GGT TCC TTC GCT AAC GTG AAC TGC TGG TGC Tyr Lys Gly Gly His Cys Gly Ser Phe Ala Asn Val Asn Cys Trp Cys 50 55 60	730										
GAG ACT TGACTCGAGG GGGGGGCCCGG TACCGGATCC AATTCCCGAT CGTTCAAACA 70 Glu Thr 65											
TTTGGCAATA AAGTTTCTTA AGATTGAATC CTGTTGCCGG TCTTGCGATG ATTATCATAT	846										
AATTTCTGTT GAATTACGTT AAGCATGTAA TAATTAACAT GTAATGCATG ACGTTATTTA	906										
TGAGATGGGT TTTTATGATT AGAGTCCCGC AATTATACAT TTAATACGCG ATAGAAAACA	966										
AAATATAGCG CGCAAACTAG GATAAATTAT CGCGCGCGGT GTCATCTATG TTACTAGATC	1026										
GGGGATCGAT	1036										

(2) INFORMATION FOR SEQ ID NO: 21:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 52 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 1"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

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AGCTTGGATA AAAGAGACAA GTTGATTGGC AGCTGTGTTT GGGGCGCCGT CA 52

(2) INFORMATION FOR SEQ ID NO: 22:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 56 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 2"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

AGTGTAGTTG ACGGCGCCCC AAACACAGCT GCCAATCAAC TTGTCTCTTT TATCCA 56

(2) INFORMATION FOR SEQ ID NO: 23:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 52 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

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(A) DESCRIPTION:/desc = "synthetic oligonucleotide 3"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

ACTACACTAG TGACTGCAAC GGCGAGTGCA AGCGCCGCGG TTACAAGGGT GG 52

(2) INFORMATION FOR SEQ ID NO: 24:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 52 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 4"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

CACAATGGCC ACCCTTGTAA CCGCGGCGCT TGCACTCGCC GTTGCAGTCA CT 52

(2) INFORMATION FOR SEQ ID NO: 25:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 56 base pairs

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- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic

oligonucleotide 5"

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

CCATTGTGGA TCCTTCGCTA ACGTTAACTG TTGGTGTGAA ACCTGATAGG TCGACA 56

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:

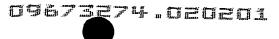
- (A) LENGTH: 52 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 6"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

GATCTGTCGA CCTATCAGGT TTCACACCAA CAGTTAACGT TAGCGAAGGA TC 52



(2) INFORMATION FOR SEQ ID NO: 27:

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(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 42 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 19"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 27:

GATCCTTCGC TAACGTTAAC TGTTGGTGTA GAACCTGATA GG 42

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 42 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

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(A) DESCRIPTION:/desc = "synthetic

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oligonucleotide 20"

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

TCGACCTATC AGGTTCTACA CCAACAGTTA ACGTTAGCGA AG 42

(2) INFORMATION FOR SEQ ID NO: 29:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 21"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

CTAGTGACTG CAACGGCGAG TGCTTGTTGC GC 32

(2) INFORMATION FOR SEQ ID NO: 30:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 26 base pairs

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(B) TYPE: nucleotide

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- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

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(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 22"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

GCAACAAGCA CTCGCCGTTG CAGTCA 26

(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 23"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

CTAGTGACTG CGCTGCTGAG TGCAAGCGGC GC 32

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(2) INFORMATION FOR SEQ ID NO: 32:

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- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 26 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 24"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32:

GCCGCTTGCA CTCAGCAGCG CAGTCA

26

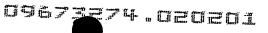
(2) INFORMATION FOR SEQ ID NO: 33:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 40 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 25"

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33:

AGCTTGGATA AAAGAGCTGC TGCTGCTGGT AGCTGTGTTT 40

(2) INFORMATION FOR SEQ ID NO: 34:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 18 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 26"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34:

GGGGCGCCGT CAACTACA

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(2) INFORMATION FOR SEQ ID NO: 35:

- (i) SEQUENCE CHARACTERISTICS:
 - (A) LENGTH: 22 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single

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(D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 27"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35:

CTAGTGTAGT TGACGGCGCC CC

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22

(2) INFORMATION FOR SEQ ID NO: 36:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 36 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 28"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36:

AAACACAGCT ACCAGCAGCA GCAGCTCTTT TATCCA 36

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(2) INFORMATION FOR SEQ ID NO: 37:

32

(i) SEQUENCE CHARACTERISTICS:

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- (A) LENGTH: 32 base pairs
- (B) TYPE: nucleotide
- (C) STRANDEDNESS: single
- (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 29"

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

CTAGTGACTG CGCTGCTGAG TGCTTGTTGC GC

(2) INFORMATION FOR SEQ ID NO: 38:

(i) SEQUENCE CHARACTERISTICS:

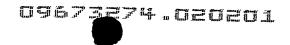
- (A) LENGTH: 26 base pairs
 - (B) TYPE: nucleotide
 - (C) STRANDEDNESS: single
 - (D) TOPOLOGY: linear

(ii) MOLECULE TYPE: Other nucleic acid

(A) DESCRIPTION:/desc = "synthetic oligonucleotide 30"

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(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38:

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GCAACAAGCA CTCAGCAGCG CAGTCA

26